



Sustainable Assessment of Hydrated Cement Treated Crushed Rock Base (HCTCRB) and Microcracking

Y.S. Yeo, P. Jitprakit and H. Nikraz

A presentation by Bay Yeo

Art concept from PCA website



Overview

- Introduction
- Advanced Pavement Materials
- Sustainability Assessment
- Results
- Recommendations

INTRODUCTION

MATERIALS

ASSESSMENT

RESULTS

RECOMMEND'N



Introduction

Road Construction/Rehabilitation

- **\$7.73** billion spent
- **1250 Mt** CO₂ emitted
- **13.9 terajoule** energy consumed



Introduction

Most significant environmental
burden:

Road Construction Material

(Mroueh et al. 1999 ; Eskola et al. 2001)

INTRODUCTION

MATERIALS

ASSESSMENT

RESULTS

RECOMMEND'N



Advanced Pavement Materials

- **Cement Treated Base with Micro-cracking** by Portland Cement Association
- **Hydrated Cement Treated Crushed Rock Base** by MAINROADS Western Australia

Reflective Cracking

Photo taken from PCA 2005

INTRODUCTION

MATERIALS

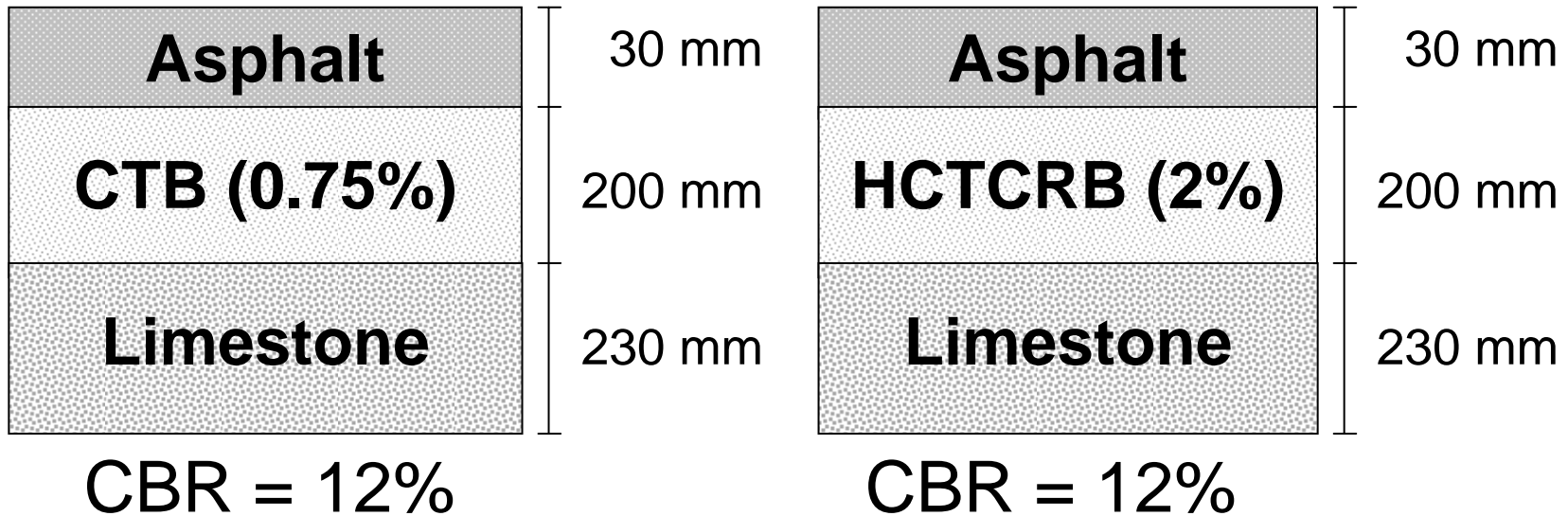
ASSESSMENT

RESULTS

RECOMMEND'N



Advanced Pavement Materials





Advanced Pavement Materials



Photo taken from PCA 2004

Applying micro-cracking
to moist cured CTB.

Micro-cracked CTB layer

Photo taken from PCA 2004

INTRODUCTION

MATERIALS

ASSESSMENT

RESULTS

RECOMMEND'N



Advanced Pavement Materials



HCTCRB after remixing

INTRODUCTION

MATERIALS

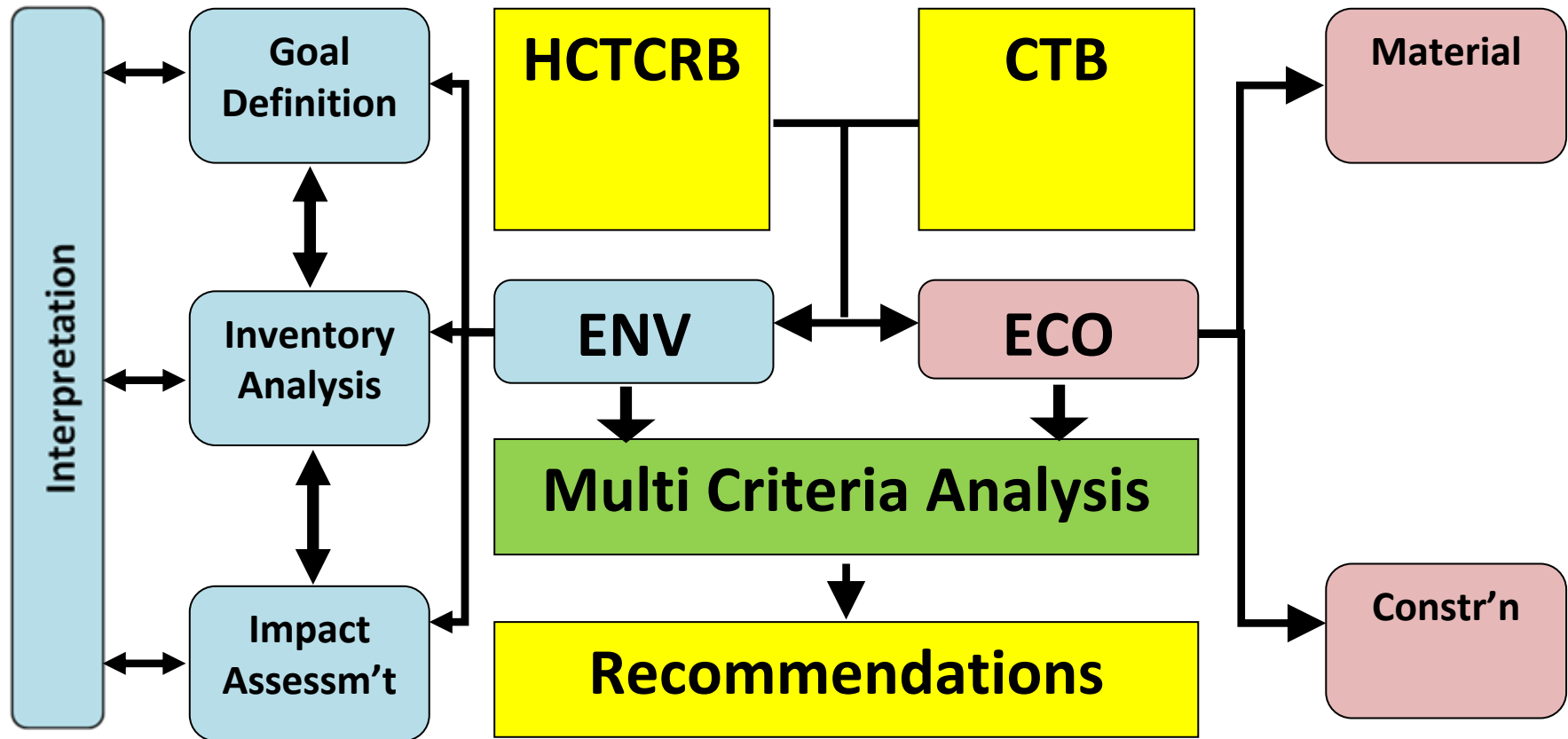
ASSESSMENT

RESULTS

RECOMMEND'N



Sustainability Assessment



INTRODUCTION

MATERIALS

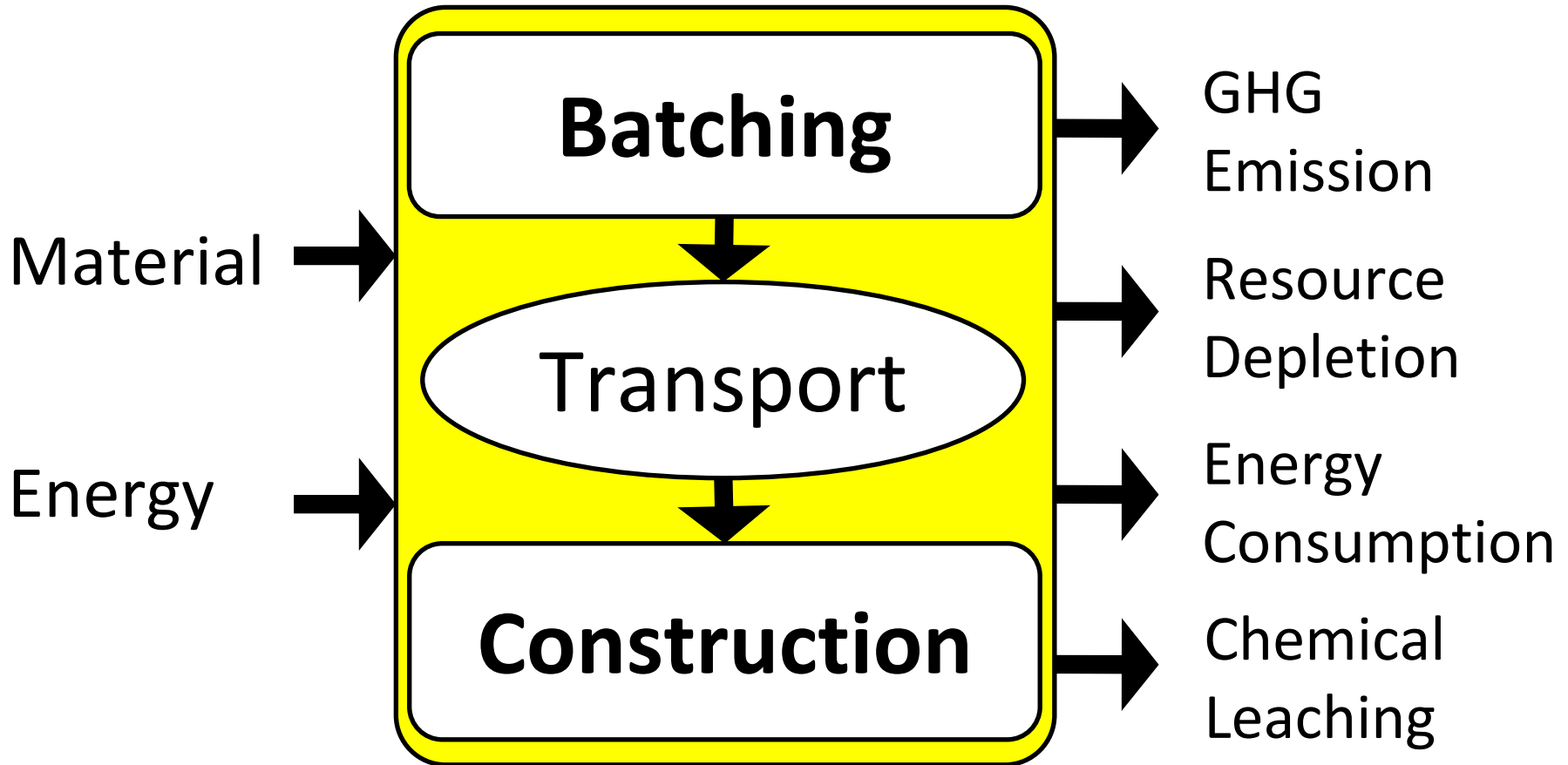
ASSESSMENT

RESULTS

RECOMMEND'N



System Boundary



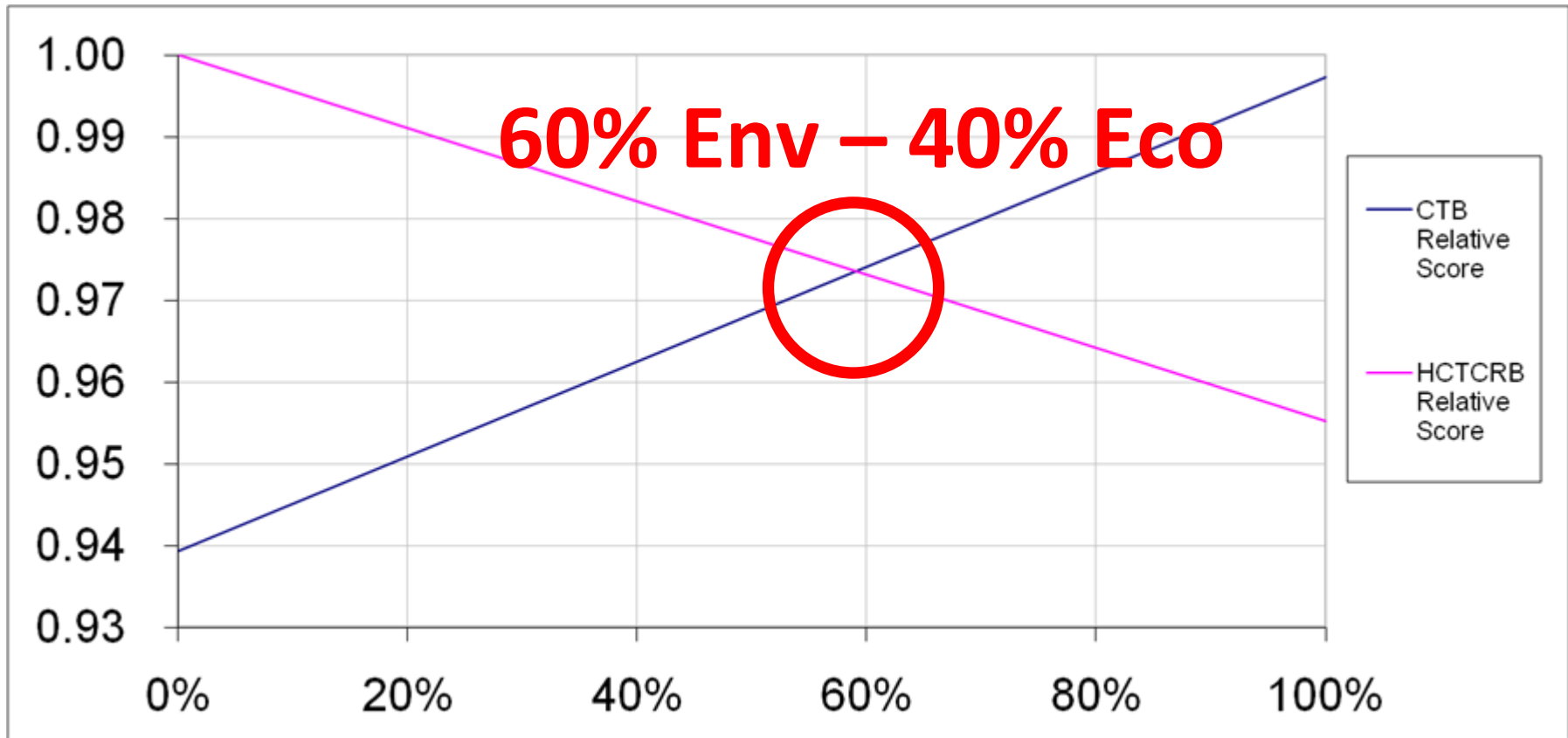


Results - Performance

Criteria	HCTCRB (2%)	CTB (0.75%) + Microcracking
Environmental (at 30%)	—	+
Economical (at 70%)	+	—
Overall	+	—



Results – Sensitivity analysis



INTRODUCTION

MATERIALS

ASSESSMENT

RESULTS

RECOMMEND'N



Recommendation

- Process improvement
- Construction control
- Further research
- Insitu-CTB for rehabilitation
- Increase knowledge base



Advanced pavement materials leads to sustainable development